

"A Comparative Crystallographical Study of the Double Selenates of the Series  $R_2M(SeO_4)_2 \cdot 6H_2O$ —Salts in which M is Magnesium." By A. E. TUTTON, B.Sc., F.R.S. Received April 29, —Read May 23, 1901.

(Abstract.)

This memoir on the magnesium group of double selenates, in which R is represented by potassium, rubidium, and caesium, is analogous to that which was presented to the Society in March 1900 concerning the zinc group.

The conclusions derived from the study of the morphological and physical properties of the crystals of the three salts are generally similar to those arrived at from the study of the zinc group. There is observed a uniform progression with regard to every property in accordance with the order of progression of the atomic weights of the three alkali metals present. That is to say, the constants of the rubidium salt are generally intermediate between those of the potassium and caesium salts.

The magnesium group has, however, proved particularly interesting, inasmuch as the progressive diminution of double refraction, according to the rule which has now been established for this series of double sulphates and selenates, leads in the case of caesium magnesium selenate to such close approximation of the three refractive indices that the crystals of this salt exhibit exceptional optical phenomena. This includes dispersion of the optic axes in crossed axial planes at the ordinary temperature, the uniaxial figure being produced for wave-length 466 in the blue; and the formation of the uniaxial figure for every wave-length of light in turn as the temperature is raised, the attainment of uniaxiality for red lithium light occurring at the temperature of  $94^\circ$ . As the life-history of the salt terminates at  $100^\circ$ , owing to the presence of water of crystallisation, this substance exhibits the property of simulating uniaxial properties at some temperature within its own life-range for every wave-length of light, while still retaining the general characters of monoclinic symmetry, including slight dispersion of the median lines. In this respect it resembles to a truly remarkable extent the analogous sulphate, which the author has shown to possess like peculiarities, but it is even more striking than the sulphate, as the dispersion is much larger. It is interesting to observe that these optical properties of caesium magnesium selenate could have been predicted, given the constants of the potassium salt and the rules of progression established for the double sulphate and for the zinc group of double selenates. For the double selenates resemble the double sulphates so closely that in general it

may be said that their properties are precisely parallel, the constants and curves being merely moved on to a slight extent by the replacement of sulphur by selenium without disturbing their relationships.

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“On the Presence of a Glycolytic Enzyme in Muscle.” By  
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It was found by Claude Bernard as well as by Ludwig and Genrich that the blood which issued from a contracting muscle contained less sugar than the arterial blood which entered it. This destruction of sugar during its passage through the muscle might no doubt be partially due to the action of the blood itself upon the sugar, but it is natural to think that it may be due to the action of some glycolytic ferment contained in the muscle itself. An attempt to isolate such a ferment or enzyme was made by one of us (Brunton) in 1873. The attempt was only partially successful. The method employed was that of von Wittich. Some fresh muscle was comminuted, thoroughly mixed with glycerine and allowed to stand for many days. The glycerine extract was then filtered off. When some of this extract was mixed with a solution of glucose and allowed to stand for some hours at the temperature of the body, a distinct diminution was observed in the amount of glucose, while a control specimen of the glucose treated in the same way with a similar quantity of pure glycerine showed no diminution. The presence of a glycolytic substance was thus clearly shown.

An attempt was made to isolate out a glycolytic enzyme from the glycerine extract by diluting the glycerine and mixing it with alcohol. A scanty white precipitate was obtained, but the precipitate exhibited little if any glycolytic power. Numerous experiments having failed to isolate the ferment, they were not published, and the result was only briefly noticed in a foot-note to a paper on Diabetes in the ‘British Medical Journal’ of February 21st, 1874. At that time, one of us (Brunton) administered raw meat to diabetic patients in the hope of supplying sufficient glycolytic ferment to enable the sugar to be better utilised in the body, and also tried the administration of glycerine extract of muscle. The success attending these attempts was not, however, sufficient to encourage the persistent use of this means of treatment, and the attempt to isolate a glycolytic ferment was abandoned for a good many years.

The success of Buchner in separating an alcoholic ferment from yeast by means of great pressure gave promise of possible success in separating a glycolytic ferment from muscle by similar means, and by